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# 1982 ANNUAL REPORT



## DIVISION of MARINE FISHERIES

GOVERNMENT DOCUMENTS Philip G. Coates, Director

COLLECTION

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Philip G. Coates, Director

Publication # 13104-42-100-2-83-C.R.

Approved by John Manton, State Purchasing Agent





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## MARINE FISHERIES ADVISORY COMMISSION

During Fiscal Year 1982, the Marine Fisheries Advisory Commission (MFAC) held 12 business meetings, and 20 public hearings under the authority of Section 17A, Chapter 130 M.G.L. The MFAC public hearings were held to receive public input on development of a Marine Fisheries Management Policy; management of Sea Herring, Atlantic Bluefin Tuna, Northern Shrimp, Surf Clams, Striped Bass, and Groundfish in State waters; out-of-state dealer inspections; use of beam and otter trawls in certain waters of outer Boston Harbor; bluefish and swordfish gill-netting; and scottish seining in North Shore coastal waters.

The Commission voted to establish a 24" fork length minimum size for striped bass, and signed a regulation governing the taking, landing and sale of Atlantic Bluefin Tuna. The MFAC also voted to rescind State limitations on landings of cod, haddock, and yellowtail flounder and to adopt minimum sizes in support of the New England Council's Interim Groundfish Plan. Seasons were established for the Northern Shrimp Fishery, and the taking of bluefish by gillnet in certain territorial waters was made a regulated fishery.

Governor King approved the Massachusetts Marine Fisheries Management Policy Report--a significant achievement which consumed many hours of the Commission's time. During the year, the Commissioners gave advice and support to Director Coates on many issues including joint ventures and the establishment of criteria for the issuance of special additional lobster licenses.

Commissioners Fields, Johnson and Swain served on Department Commissioner Chmura's Advisory Commission. Commissioner Charles Fields, whose term expired, was replaced by Ted Costello. Commissioners Johnson, Stromeyer and Faro were reappointed by Governor King.

Respectfully submitted,

Elizabeth Stromeyer, Chairperson  
Francis Mirarchi, Vice-Chairperson  
Joseph Brancalone, Clerk  
Thomas Bartlett  
Jack Conroy  
Bernard Costello  
Angelo Faro  
Charles Fields (until 8/23/81)  
Morris Johnson  
Harry Swain





## GENERAL COUNSEL

### Litigation:

A. A. Ferrante Fishing Corp., et al., v. Allen E. Peterson, Jr. et al. An action by plaintiff bluefin tuna fishermen seeking a temporary restraining order against enforcement of federal bluefin tuna regulations which implemented the ICCAT recommendation for a two-year moratorium in the Atlantic bluefin tuna fishery. This action was transferred from Federal District Court in Massachusetts to the District Court for the District of Columbia and consolidated with a similar suit pending in that court. The Commonwealth filed a brief and made an appearance as an amicus curiae in support of plaintiff's action. The court denied the motion for a temporary restraining order based upon foreign policy implications and U.S. international treaty commitments under the International Convention for the Conservation of Atlantic Tunas.

United States v. Maine, et al. (Massachusetts): Litigation between the Commonwealth and the United States over ownership of Nantucket Sound was reinstituted when attempts to designate the central portion of the Sound as a federal marine sanctuary failed. NMFS may have violated the interim Memorandum of Settlement signed by the United States and the Commonwealth when they failed to properly condition a squid joint venture not to operate within the Sound. The Commonwealth alleged that the operation of a foreign processing vessel in the disputed waters upset the status quo and violated the agreement. NMFS thereafter properly conditioned the joint venture to avert the Commonwealth's threatened legal action.

Robert Enos, et al., v. Scott H. Nolan, et al: Appeared in Barnstable Superior Court and in the Massachusetts Appeals Court regarding legal challenges to Chapter 363 of the Acts of 1982 which authorized the Division to regulate the surf clam and ocean quahog fisheries. Both courts ruled the statute did not mandate emergency promulgation of regulations by the Division.

### Legislation:

Eight bills were drafted and transmitted to the Legislature: House 100--An Act Repealing Certain Archaic Special Acts Of The Legislature; House 101--An Act Relative To The Sale of Fish Without A Commercial Fishermen Permit; House 102--An Act Relative To The Conservation and Management Of The Surf Clam And Ocean Quahog Fisheries; House 103--An Act To Clarify The Jurisdiction And Authority Of Agencies Within The Department Of Fisheries,





Wildlife And Recreational Vehicles; House 104--An Act Relative To The Commercial And Recreational Fishing Industry Of The Commonwealth; House 105--An Act Providing For Administrative Enforcement Of Marine Fishery Laws; House 106--An Act Providing For Certain Categories Of Permits; House 107--Order Directing The Committee On Natural Resources And Agriculture To Investigate And Study The Feasibility Of Requiring A Salt Water Sport Fishing License. Oral and written testimony was drafted and submitted to the Committee.

As of July 1982 three Bills were signed into law by the Governor. Chapter 131 of the Acts of 1982 increased the fines for violations of marine fishery laws. Chapter 363 of the Acts of 1982 authorized the Division to regulate the commercial surf clam and ocean quahog fisheries. Chapter 769 of the Acts of 1981 clarified section 38B of Chapter 130 by providing for the issuance of only 20 special additional lobster licenses in any year subsequent to 1981.

#### Regulations:

Striped bass regulations were amended by repealing the authorized bycatch of 4 fish which are less than the 24-inch minimum requirement thereby making it unlawful to harvest any striped bass less than 24 inches. State groundfish regulations were amended by deleting the quota system and replacing it with minimum length requirements for cod, haddock and yellowtail flounder--all consistent with the Groundfish Plan developed by the New England Fishery Management Council. Area restrictions for the netting of bluefish were developed. State Atlantic bluefin tuna regulations were amended to authorize the licensing of any purse seine vessel with a federal bluefin tuna allocation in any year prior to and including 1981. Emergency regulations for the commercial surf clam fishery were promulgated to establish trip limits, minimum dredge size, reporting requirements and closed areas. Regulations were extended for the northern shrimp fishery for the 1982 fishing season. Criteria under which coastal commercial lobster licenses may be transferred to a business entity with the approval of the Director were drafted.

#### Adjudicatory Proceedings:

In Re: Nagus was found in violation of the master digger regulations governing records, racks, storing and transportation of moderately contaminated shellfish and given a 30-day suspension of his master digger permit. In Re: Jorge was found to have three convictions of the marine fishery laws and was given a one-year suspension of his coastal commercial lobster permit. In Re: Wiitala was found not to have delivered all moderately contaminated shellfish to the depuration plant and was given a





30-day suspension of his master digger permit and a \$500 bond revocation. In Re: Hallsen was found not to have delivered all moderately contaminated shellfish to the depuration plant and was given a 60-day suspension of his master digger permit for a second conviction and a \$500 bond revocation. In Re: Lane was found not to have delivered all moderately contaminated shellfish to the depuration plant and was given a 30-day suspension of his master digger permit and a \$500 bond revocation. In Re: Eliopolous was found not to have delivered all moderately contaminated shellfish to the depuration plant and was given a 30-day suspension of his master digger permit and a \$500 bond revocation. In Re: Pearson was found to have falsified his application for a special additional lobster license and his coastal commercial lobster license was revoked.

### Legal Opinions:

Legal opinion to the Director concluded that the Division had the authority subject to an Adjudicatory Proceeding, to suspend, revoke or refuse to renew the commercial fishermen permit of any individual who fails to file a catch report. A legal memorandum to the Secretary concluded that regulations of the Division as codified in 322 Code of Massachusetts Regulations do not fall within Executive Order 198 as they do not directly affect the construction, alteration or usage of facilities or land. A legal memorandum was written enabling the Director to formulate a response to questions raised by the Massachusetts Lobstermen's Association regarding Division implementation of Chapter 444 of the Acts of 1980. Legal opinion to the General Counsel of the Executive Office of Environmental Affairs was given regarding the regulatory authority of the Division. A legal response to the General Counsel of the Executive Office of Environmental Affairs through the Director was prepared to challenge the legal conclusion of the Executive Office that the Department of Public Health and the Executive Office have the requisite authority to enter into a Memorandum of Understanding on the operation of the depuration plant in Newburyport. Legal opinion to the Commissioner was written regarding activities of personnel of the Division of Law Enforcement. The legal brief filed in United States District Court for the District of Columbia in the A. A. Ferrante case was researched and drafted.

### Projects:

All deeds to property owned by the Division were compiled in compliance with Chapter 579 of the Acts of 1980. The Division was represented in the purchase from Newburyport of property on Plum Island for the depuration plant including title search, deed drafting and recording and approval from the Governor and the Division of Capital Planning and Construction. A manual of Statutes and Regulations Governing the Marine Fisheries of the Commonwealth of Massachusetts was published and distributed to District and





and Superior Court Judges and District Attorneys in coastal jurisdictions, as well as to all Natural Resource Officers, state and federal marine fishery officials, state and Congressional legislators. Comments were provided on regulations of the National Oceanic and Atmospheric Administration establishing the procedures by which the United States can preempt Massachusetts territorial waters for fishery management purposes. Counsel closely monitored federal implementation of the ICCAT bluefin tuna moratorium, filed Freedom of Information Act request and formal appeal to the Secretary of Commerce for the release of federal tuna documents and drafted comments on bluefin tuna environmental impact statement and regulations. An administrative record for Department of the Attorney General was compiled to support Massachusetts' case U.S. v. Maine. A two-week training seminar at Columbia Law School entitled Professional Development for Lawyers was attended. A Law Review article analyzing the international management of Atlantic bluefin tuna was written and discussed by the Suffolk University Law School's Journal of Transnational Law.

#### COUNCIL LIAISON

The Massachusetts Council Liaison position was created in 1977 to assist the Director carry out his added responsibilities acquired when the Fishery Conservation Management Act was enacted and Fishery Management Councils were established, and to serve as a liaison between the Division and fishing industry regarding Council/State progress and problems with management of commercial and recreational fisheries in state and federal waters.

Liaison activities have become more numerous and diverse since 1977. Many Council Management Plans have been written and amended--notably Groundfish (cod, haddock and yellowtail flounder), Sea Herring, Sea Scallops, Lobster, Surf Clams and Ocean Quahogs, Squid, Mackerel and Butterfish. The Division has had to contribute towards this management process at Council and State levels. Other Plans affecting Massachusetts commercial and recreational fisheries have been in various stages of development since 1977--namely Bluefish, Swordfish, Billfish and Sharks, Flounders, Redfish and Silver Hake.

A detailed historical account of sea herring management from 1976 to 1982 was drafted. The primary purpose of the paper entitled "Development and Evolution of the Sea Herring Management Plan" is to provide new Council members with a means to quickly review past and present management efforts. A more concise paper entitled "Sea Herring Management--One State's Perspective" was written and presented at the 1982 Northeast Fish and Wildlife Conference.

This fiscal year Council sea herring management culminated with the realization that Council Plan objectives were out-of-date





and unrealistic and that continuation of the Plan was contingent on greater cooperation by states. To address the first problem, the Liaison, as Chairman of a Herring Committee Working Group, helped design new objectives responsive to changing world market conditions and knowledge that sea herring stocks are susceptible to rapid collapses in abundance. Regarding the second problem, these objectives will likely be the basis for an effort spear-headed by states (primarily Massachusetts and Maine) to write a "new" Plan. This past year the Regional Director of the National Marine Fisheries Service related his recommendation to Washington that the Council Plan be rescinded since the sea herring fishery evolved to one carried out primarily in states' waters and, in his view, states were not supportive of the Council Plan.

Other sea herring-related activities were: handling of matters related to a fall closure of the herring fishery in the State's Northern Massachusetts Management Area including correspondence with the Council describing Division intent for the fall and correspondence with herring industry representatives explaining our position; reviewing proposals to the Council requesting monies for herring research; serving as the Division's representative at six Council Herring Committee meetings; and, providing an interview on sea herring management for the Marketing Program's radio show, "Fish and Tips."

A detailed, historical account of Groundfish Management from 1976 to 1982 was drafted. As with the Herring prospectus, this paper entitled "Development and Evolution of Plans for Management of Cod, Haddock and Yellowtail Flounder" was to brief new Council members and others interested in the long, complex and confusing goings-on of Council groundfish management. A presentation on Massachusetts management of these three species and the Division's views on the recently implemented, relatively non-restrictive, Council Groundfish Interim Plan was given at a Workshop of the Southern New England Chapter of the American Fisheries Society.

To respond to the anticipated spring/summer implementation of the Council Groundfish Interim Plan, four state public hearings were arranged, presentations given at each, and results summarized for the Director and Advisory Commission to facilitate decisions on groundfish regulations for Massachusetts waters.

The Council finally completed a Sea Scallop Management Plan after five years of development, and it was implemented on an emergency basis this spring. A summary of the Plan was written for New England and Mid-Atlantic Council members. Proposed Plan regulations were reviewed for the Director (Chairman of the Council's Sea Scallop Committee). Division comments were prepared and forwarded to NMFS, implementors of the Plan. Two Commission/Division hearings were arranged and attended to solicit public input and advice on changes in State sea scallop regulations to comply with the Council Plan; the Liaison chaired one of the hearings. Background material, presentations, and summaries were prepared to assist the Director and Commission



develop a State response. Another historical account entitled "Development and Evolution of the Sea Scallop Management Plan" was begun.

Other activities were:

- prepared correspondence with the Secretary of State to protest allocations of squid to foreign fishermen from the reserve of the Mid-Atlantic Council's Squid Management Plan;
- provided views of future of fishery resources and sustainable yields which could support development of the Town of Sandwich boat basin;
- helped prepare a Council response to NMFS revisions in Fishery Conservation and Management Act National Standards Guidelines;
- assembled for the Mid-Atlantic Council, Massachusetts regulations affecting commercial and recreational fisheries managed by that Council's existing and proposed management plans (Squid, Mackerel, Butterfish, Surf Clam, and Ocean Quahog, Tilefish, Summer Flounder, Scup, Bluefish, Black Sea Bass and Sharks);
- assisted the Director in his efforts for State waters surf clam management by preparing a review and summary of the Mid-Atlantic Council's Surf Clam Management Plan;
- prepared Division comments for the Director to protest proposed reductions in the Coast Guard budget which would affect enforcement of fisheries regulations, search and rescue, and aids to navigation;
- assisted the Director prepare for a public hearing on a proposal to ban Massachusetts landings of gillnet-caught swordfish. The South Atlantic Fishery Management Council's Draft Swordfish Plan was reviewed and a summary prepared. Swordfish fishermen were contacted to acquire their viewpoints;
- provided suggestions for Division reorganization and assisted the Director describe Division recent accomplishments for the Commissioner;
- gave interviews on Fisheries Conservation and Management Act and Council progress and replied to correspondence seeking information on the New England fishing industry and the Division;
- acted as the Director's designee at four days of Fishery



THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

RESEARCH REPORT

NO. 1234

1955

BY

J. D. JARVIS

AND

R. L. JARVIS

Council meetings and attended another 13 days of Council meetings;

--attended Council hearings and Committee meetings:

- 1 Groundfish Committee
- 3 Scallop Committee
- 2 Council public hearings
- 1 Swordfish Committee
- 1 Regulatory Measures Committee

--attended three Marine Fisheries Advisory Commission meetings, one New England Marine Advisory Service meeting and a meeting of the CZM Legislative Committee.

#### BUREAU OF ADMINISTRATION AND OPERATIONS

##### Cat Cove Marine Laboratory

Each year some major environmental problem creates a heavy workload for this laboratory and other laboratories concerned with the marine environment. In the past years such things as PSP, oil spills, pesticides and mercury in the environment have all had their turn sharing the limelight. This year, for the second year in a row, analysis for PCB's, particularly from the Acushnet River area, have occupied the bulk of time, space and equipment at this laboratory. During fiscal year 1982 the laboratory conducted more than 150 PCB research and monitoring analyses. This program monitors PCB's in lobsters to allow for maximum utilization of the resource while protecting the health of the consumer. In past years the Division's laboratory has been the principal location in Massachusetts for the analysis of PCB's in marine organisms. The EPA had contracted with Metcalf & Eddy Company for the computerization of all marine PCB analyses conducted in the United States. Laboratory personnel have spent considerable time reviewing and correcting this program with Metcalf and Eddy. Also, this laboratory, in cooperation with the National Marine Fisheries Service Laboratory in Gloucester, conducted a series of studies on the possibilities of depurating PCB's from lobsters by gamma irradiation. Test results were negative and the project was discontinued.

The laboratory staff also conducted 250 heavy metal analyses this fiscal year. The laboratory accepted two graduate student trainees to work on environmental stress created by heavy metals in the environment. The laboratory continued to maintain its Gonyaulax tamarensis stock cultures, available for in-house research and for use by other laboratories. The gas chromatograph was upgraded this year to meet the FDA recommendations; however, it must be pointed out that until the laboratory instrumentation

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185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 | 1009 | 1010 | 1011 | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 | 1021 | 1022 | 1023 | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 | 1037 | 1038 | 1039 | 1040 | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 | 1049 | 1050 | 1051 | 1052 | 1053 | 1054 | 1055 | 1056 | 1057 | 1058 | 1059 | 1060 | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 | 1069 | 1070 | 1071 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 | 1079 | 1080 | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 | 1088 | 1089 | 1090 | 1091 | 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 | 1104 | 1105 | 1106 | 1107 | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 | 1117 | 1118 | 1119 | 1120 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 | 1129 | 1130 | 1131 | 1132 | 1133 | 1134 | 1135 | 1136 | 1137 | 1138 | 1139 | 1140 | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 | 1149 | 1150 | 1151 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 | 1163 | 1164 | 1165 | 1166 | 1167 | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 | 1177 | 1178 | 1179 | 1180 | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 | 1189 | 1190 | 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 | 1200 | 1201 | 1202 | 1203 | 1204 | 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 | 1213 | 1214 | 1215 | 1216 | 1217 | 1218 | 1219 | 1220 | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 | 1229 | 1230 | 1231 | 1232 | 1233 | 1234 | 1235 | 1236 | 1237 | 1238 | 1239 | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 | 1248 | 1249 | 1250 | 1251 | 1252 | 1253 | 1254 | 1255 | 1256 | 1257 | 1258 | 1259 | 1260 | 1261 | 1262 | 1263 | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 | 1270 | 1271 | 1272 | 1273 | 1274 | 1275 | 1276 | 1277 | 1278 | 1279 | 1280 | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 | 1289 | 1290 | 1291 | 1292 | 1293 | 1294 | 1295 | 1296 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1307 | 1308 | 1309 | 1310 | 1311 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 | 1328 | 1329 | 1330 | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 | 1339 | 1340 | 1341 | 1342 | 1343 | 1344 | 1345 | 1346 | 1347 | 1348 | 1349 | 1350 | 1351 | 1352 | 1353 | 1354 | 1355 | 1356 | 1357 | 1358 | 1359 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 | 1366 | 1367 | 1368 | 1369 | 1370 | 1371 | 1372 | 1373 | 1374 | 1375 | 1376 | 1377 | 1378 | 1379 | 1380 | 1381 | 1382 | 1383 | 1384 | 1385 | 1386 | 1387 | 1388 | 1389 | 1390 | 1391 | 1392 | 1393 | 1394 | 1395 | 1396 | 1397 | 1398 | 1399 | 1400 | 1401 | 1402 | 1403 | 1404 | 1405 | 1406 | 1407 | 1408 | 1409 | 1410 | 1411 | 1412 | 1413 | 1414 | 1415 | 1416 | 1417 | 1418 | 1419 | 1420 | 1421 | 1422 | 1423 | 1424 | 1425 | 1426 | 1427 | 1428 | 1429 | 1430 | 1431 | 1432 | 1433 | 1434 | 1435 | 1436 | 1437 | 1438 | 1439 | 1440 | 1441 | 1442 | 1443 | 1444 | 1445 | 1446 | 1447 | 1448 | 1449 | 1450 | 1451 | 1452 | 1453 | 1454 | 1455 | 1456 | 1457 | 1458 | 1459 | 1460 | 1461 | 1462 | 1463 | 1464 | 1465 | 1466 | 1467 | 1468 | 1469 | 1470 | 1471 | 1472 | 1473 | 1474 | 1475 | 1476 | 1477 | 1478 | 1479 | 1480 | 1481 | 1482 | 1483 | 1484 | 1485 | 1486 | 1487 | 1488 | 1489 | 1490 | 1491 | 1492 | 1493 | 1494 | 1495 | 14 |
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is computerized we will not be up to date in our processes and results. The laboratory assisted Dr. Martin of the University of Massachusetts in applying for a grant to study the life history of the mahogany quahog and the effects of toxins and pollution on this organism.

During the year the laboratory continued to provide support for the shellfish depuration program: 1) working with the architects and engineers to develop plans for a renovated depuration plant, 2) working with Federal-State and local communities for the development of the depuration program, 3) assisting in the development of a 24-hour depuration pilot study, 4) evaluating analyses on the test mode, and 5) providing manpower when the need arose.

The laboratory was the recipient of a grant for an energy audit to update energy conservation for the building.

Under the state education leave program John DerHovanesian received his Doctor's degree from Northeastern University in June of this year.

#### Publications:

Anderson, Koulas, Othanos and Ceurvels. 1982. Distribution of the Toxic Dinoflagellate Gonyaulax tamarensis in the Southern New England Region. Estuarine, Coastal and Shelf Science. Vol. 14, pp. 447-458.

Der Hovanesian, John. The Role of Saxitoxin in the Biology of Gonyaulax tamarensis. Ph.D. Dissertation. Northeastern University. September 1981.

#### Chief of Research

The research vessel F.C. WILBOUR was utilized to assist four research projects. Eleven days were spent in New Bedford Harbor to sample lobsters and bottom fish for PCB analysis. Fifteen days were spent dredging quahogs in the Taunton River to complete a quahog population survey in that area. Three weeks were spent assisting the Cape and Islands Area Team and the Town of Yarmouth transport 500 tire units to the artificial reef in Nantucket Sound.

Annual haul-out and maintenance of the vessel was conducted by the crew instead of having the work done in a boatyard. Work included scraping, painting, replacement of zincs, repaneling of the interior of the pilot house and construction of a new boom. In addition, ten days were spent repairing nets for the Resource Assessment project. It was estimated that work performed by the crew rather than by a private vendor resulted in savings of



approximately \$4,500.

The Young Adult Conservation Corps (YACC) program terminated in March, 1982. Since the inception of the program in 1978, a total of 30 enrollees were employed under the supervision of DMF in Sandwich. Approximately 50% of these enrollees successfully completed the authorized one year of employment. Most enrollees left the YACC program finding more gainful employment; three were hired as full-time employees of DMF. DMF participation satisfied the program goal of providing employment and training to youths who would not have been otherwise employed, as well as providing a supplementary work force of laborers utilized by most south shore projects.

#### BUREAU OF RESEARCH

##### Fishery Resource Assessment

The departure of Jim Buckley for private industry followed by the Division's inability to fill two vacant positions, resulted in half staffing for nine months. This unfortunate predicament was partially offset by some timely assistance from Bruce Estrella, a former team biologist, and an interruption in normal operational routine which permitted the project leader, Arnold Howe, to write a contracted report. The hiatus was occasioned by Northeast Fisheries Center (NEFC) reprogramming of its assessment analysis computer system (on which we depend to analyze trawl survey data) coincident with installation of the new Woods Hole Oceanographic Institute's VAX II computer system. Bruce converted our computer file character codes so as to be compatible with the new system and also filled a major void in our personnel roster on two research survey cruises.

With regard to our coastwide trawl survey program, a milestone was reached and successfully passed. For the first eight cruises, we chartered the fishing vessel FRANCES ELIZABETH. Because of State budgetary cutbacks, it was necessary to engage the NOAA research vessel GLORIA MICHELLE for cruise #939 and, at the same time, ensure its future availability. The GLORIA MICHELLE was ably staffed by members of NMFS/URI Fisheries Engineering Group and in March, project staffing was augmented with transfer of Tom Currier into the vacant Assistant Marine Fisheries Biologist position. A summary of FY 1982 cruise effort and collections follows:

|                    | <u>Cruise #928</u> | <u>Cruise #929</u> |
|--------------------|--------------------|--------------------|
| Vessel hours       | 175.7              | 228.5              |
| Sampling days      | 15                 | 17                 |
| Stations completed | 95                 | 95                 |





|                                  | <u>Cruise #928</u> | <u>Cruise #929</u> |
|----------------------------------|--------------------|--------------------|
| Stations aborted                 | 8                  | 10                 |
| Net repair man-hrs at sea        | 22                 | 9                  |
| DMF participants                 | 20                 | 22                 |
| Scientific man-hrs at sea        | 496.5              | 645.0              |
| Total catch weight (kg)          | *                  | *                  |
| Total catch number               | *                  | *                  |
| Age, growth and maturity samples | 642                | 1,185              |
| Age and growth specimens         | 170                | 875                |
| Food habit specimens             | 0                  | 0                  |
| Pathobiological observations     | 1,288              | 7,313              |
| Special samples                  | 130                | 405                |
| *data unavailable at this time   |                    |                    |

The data and information from standardized time-series continues to be shared with the NEFC where it has become an integral part of their stock assessments. Despite limited personnel, there has been no diminution in our efforts to disseminate resource information in response to inquiries from many Federal, state and University investigators.

As part of an MCZM Coastal Energy Impact Grant, Frank Germano continued (from May, 1981) to lead three-day seasonal (July, September, December) fisheries and hydrographical sampling efforts aboard the FRANCES ELIZABETH at two existing open water dump sites and three alternative locations in Cape Cod Bay. The purpose was to determine site-specific fisheries and environmental baselines relative to dredge spoil disposal.

Study results indicated that threshold limits of temperature and dissolved oxygen for fish and other organisms would only be remotely approached after disappearance of the seasonal thermocline in autumn. A relatively low incidence of fish disease and skeletal abnormalities suggested that Bay waters are relatively unaltered at present time. Emphasizing the utilization and importance of the Bay as nursery habitat, 13 of 19 species landed by the nearshore fishery, were entirely or partly represented in research catches by juvenile forms. For winter flounder and yellowtail flounder, two of the most important species, there was no apparent difference in abundance or size composition between sampling sites of comparable depth. Seasonal comparisons suggest that except in vicinity of active spoiling operations, where increased suspended sediment loads may impose lethal effects on sensitive egg and larval stages, continued aperiodic disposal of clean spoil would apparently cause minimal impact to fisheries resources. The disposal of contaminated spoil would result in a long-term pollution source which will lead to increased environmental stress and cause insidious adverse impacts on fisheries resources.

During the third year of the Atlantic cod ageing contract with NMFS, Doris Jimenez Brennan, based at the Cat Cove Laboratory, processed and aged a total of 4,207 cod and 2,790 pollock





otoliths eliminating the backlog of samples for these species. Otoliths are now processed when received from the Woods Hole Laboratory or from this project's cruises. She also aged 453 smelt scales for the Pilgrim Power Plant project as well as 200 alewife otoliths for the Anadromous Fish project.

In August, 1981, Arnold Howe ended his assignment with the Atlantic States Marine Fisheries Commission Summer Flounder Scientific and Statistical Committee after the Committee's completion of a draft Fisheries Management Plan. The Plan has been under review since its submission to the Middle Atlantic Fishery Management Council.

#### Publications:

Howe, A.B., F.J. Germano, Jr., J.L. Buckley, D. Jimenez, and B.T. Estrella. 1981. Coastwide Fisheries Resource Assessment, Federal Aid Annual Report.

Howe, A.B., and F.J. Germano, Jr. 1981. Results of Massachusetts Trawl Survey Show Changes in Inshore Fish Abundance. Coastal Oceanography and Climatological News. Vol. 3(4):52-53.

Howe, A.B. 1981. The Massachusetts bottom trawl survey (#928). Mass. Div. Marine Fisheries News Report in Commercial Fisheries News, September.

Howe, A.B. 1982. The Massachusetts bottom trawl survey (#929). Mass. Div. Marine Fisheries News Report in Commercial Fisheries News, Submitted for Publication.

Howe, A.B., and F.J. Germano, Jr. 1982. Fisheries and Environmental Baselines Relative to Dredge Spoil Disposal, Cape Cod Bay, 1981. Mass. Div. Marine Fisheries.

#### Marine Fisheries Policy Program

The Marine Fisheries Policy Program terminated operation in June with the issuing of the final report, Massachusetts Marine Fisheries Management Policy Report. With approval from the Governor, the report was widely distributed to the public; commercial and sport fishing interests; federal, state and intrastate agencies. It is hoped the report will set the tone for responsible fisheries management, promotion and development involving a knowledgeable and active public.

The past year's efforts have centered on reviewing public comments on the draft policy report and making revisions for the final report. Comments from the general public and state and federal agencies were organized and presented to the



Massachusetts Marine Fisheries Advisory Commission (MFAC) for response. In addition, the MFAC and DMF administration examined in more depth certain controversial issues such as contaminated dredge spoils, shellfish and eel management, and law enforcement.

The report was revised with editorial changes, addition of a new section, responses to public comments, and redrawing of all maps. The new section described the various marine habitats (e.g., salt marsh, estuaries, shellfish beds, streams, etc.) and their dependent species. Responses to public comments were developed on a policy-by-policy basis, responding to both written and verbal comments from public meetings.

On termination of the project, Thomas Hotz left the Division for private enterprise. His assistance was invaluable to the project's success.

### Pilgrim Power Plant Investigations

The Pilgrim Power Plant project continued ecological studies in western Cape Cod Bay (focusing on the offsite waters of Pilgrim Nuclear Power Station) to assess environmental impact of power plant operation. Main objectives were to identify, measure, and report on short-term and more subtle long-term effects on marine life resulting from the non-radiological operations of Pilgrim I. Additionally, remedial or corrective procedures were recommended when structural or operational factors were determined to adversely affect the local marine ecosystem.

During the past few years, sampling design was modified and expanded to render all studies more impact-related and comprehensive. Haul seining was conducted for the second year to address nearshore fish not representatively sampled by trawl or gill net. One of the sampling stations was located in the power plant's intake embayment to monitor backwash procedures and to serve as an indicator of potential sources of impinged fish. The majority of catch was young-of-the-year and forage fishes commonly found in the intertidal or shallow sub-tidal zones.

To acquire maneuverability and to avoid lobster gear when sampling groundfish in the immediate vicinity of the plant's discharge, a half-Wilcox trawl (9.8 m sweep) was towed from our 7 m craft (Sea Ox). This enabled trawling proximal to the discharge canal in the area impacted by effluent current and waste heat. Nearshore trawling was conducted monthly in 1981 and biweekly in 1982 at four stations following a systematic, standardized sampling procedure. Catch data were processed, and abundance indices calculated and examined for spatial and temporal trends. Four species were predominant, viz. winter flounder, yellowtail flounder, little skate, and windowpane, comprising 94.4% of the total catch.

Otter trawling (half-Yankee 10.7 m bottom otter-door trawl) from the Division's R/V F.C. WILBOUR continued on a monthly





schedule in the environs of the plant but at greater depths than nearshore trawling. Catch data rendered estimates of relative abundance, thus maintaining the long-term time series record (12 years) of groundfish and lobster stocks in western Cape Cod Bay.

Overnight gill net sets were made twice a month. To increase spatial coverage, two stations were sampled--one south of the discharge canal parallel to the intake breakwater at the 3 m depth contour (MLW) and the other just north of the effluent jetties at the same depth. Sets of a 213.4 m net were made on consecutive nights, whenever possible, to facilitate data comparisons. This sampling program has yielded population estimates of pelagic fish frequenting the area.

The configuration of diving stations allowed us to representatively sample the area of the thermal discharge plume directly. Biologist-divers, using SCUBA, observed and recorded occurrences, distribution, abundance, condition, and behavior of finfish at six stations just outside the discharge canal on a biweekly basis from March to November. Based on our sightings, it appeared that some species of fish were attracted to plant effluent--an area of potentially high risk to gas bubble disease problems. Cunner was found to be the dominant species residing in the vicinity of the discharge.

Because of an important commercial lobster fishery in the area, the pot catch sampling study of lobsters was continued. Sampling is conducted during the inshore lobster season with the cooperation of two commercial lobstermen. Catch records were compiled and analyzed by quadrat to compare surveillance and reference locations. During the last four years, lobstermen intensified their potting efforts on sand substrate throughout the area. The apparent shift in stock distribution and/or increase in local stock size off the traditional hard bottom was supported by marked increases in lobster catch in our trawl surveys.

Irish moss landing records were again obtained from eight zones along the coastline, ranging from Manomet to Warren Cove. From harvest and effort data, harvest rates were calculated. Comparisons by area and over time were made to assess plant impact on the harvesting of this commercial resource. Impact to date was deemed minimal.

Prescribed radiological collections of sediment cores, flora, and fauna were made during each season of the year. An expanded program, adopted in 1981, provided synoptic data measurements of direct radiation and radioactivity in aquatic environmental media in the vicinity of Pilgrim Station and at selected control locations. Additional core samples were collected in the plant's intake embayment in anticipation of planned





maintenance dredging.

This spring, a small scale in vitro study on the survivorship of smelt eggs exposed to low pH water was performed. With the completion of 1981 field work and laboratory analyses, a three-year field study of the spawning stock of smelt in the Jones River was terminated. Information on spawning behavior, population dynamics, age-class structure, and estimated size of the stock were obtained. This provided insight into the question of potential impact of Pilgrim operation on the local smelt population. Study findings were presented in a 1981 final report published by Boston Edison Company.

Results of 1981 fisheries studies were published by Boston Edison in the format of an annual progress report which is available upon request. Analyses and writing on work conducted from January to June, 1982 is ongoing. Two papers examining the abundance and distribution of lobster larvae in Cape Cod Bay and Buzzards Bay received final peer review before being published in the Special Scientific Report on the Fisheries, a journal publication of the National Marine Fisheries Service. In addition, second drafts of a manuscript on project investigations were completed and reviewed for incorporation in a monograph document on 10 years of non-radiological studies in the off-site waters of Cape Cod Bay.

#### Lobster Hatchery and Research Station

Work at the lobster hatchery and research station involves learning more about the basic biology of lobsters. This includes studies on disease control and prevention, bioengineering, hatchery systems, genetics and behavior, and nutrition and feeds. Information gathered in these studies is helpful in designing management schemes for wild stocks. Along with this work, hundreds of thousands of lobsters are hatched and reared through the vulnerable stage into the bottom crawling stage and liberated into waters of the Commonwealth. The hatchery has more than 30,000 visitors annually.

Hatchery personnel conducted courses for state and federal law enforcement officers on techniques used to identify lobsters that have had their eggs removed illegally.

The Division's research station hosted 25 members of the International Council for the Exploration of the Sea (ICES) who represented several European nations. We also shared and exchanged research information this year with investigators from New Zealand, Wales, Australia, Belgium, Spain and Japan.

Private sources made a gift to the research station--a thermal system using solar energy to heat seawater. This included necessary components for a closed seawater loop; i.e.,





ultraviolet sterilizer, earth filters, biological filters, insulation, piping, etc. When completed, seawater temperatures in our experimental tanks will be kept at 70°F during the year. This will enhance lobster development and growth and reduce the time to reach various plateaus.

## BUREAU OF SPORTFISHERIES

### Assistant Director for Sportfisheries

Among the most significant Division accomplishments of 1981 was completion of the new Anadromous Fish Hatching and Rearing Station in East Sandwich. This facility became operational in late summer and was formally dedicated in memory of outdoor writer Arthur Sullivan on October 4. A joint effort with the Division of Fisheries and Wildlife, the project was 50% funded with federal monies, made available through the Anadromous Fish Conservation Act, Public Law 89-304.

Annual production estimates for the new hatchery are 100,000 coho salmon smolt, and 50,000 sea-run brown trout. This agency expects to reach projected production levels of coho as early as 1983, in which case fall runs of returning adults will increase markedly commencing in 1984. In addition to enhancing fishing opportunities, larger runs will facilitate a meaningful evaluation of the sportfishing potential of a coho stocking program.

Striped bass landings on the east coast have declined steadily since 1973 due to the lack of dominant year classes since 1970. This situation prompted initiation of a state/federal program aimed at developing a management plan for coastal migratory stock of striped bass. This plan was completed and unanimously adopted in October 1981 by the 12 coastal states from Maine through North Carolina.

The major objectives of the plan are 1) to maintain a spawning stock, thereby minimizing possibility of recruitment failure, and 2) to reduce variation in annual abundance available for harvest. The strategy proposed to achieve these objectives involves a combination of minimum size increases and spawning area closures that take into account the important geographical differences in the fishery.

Several states, including Massachusetts, acted promptly to implement management plan provisions. Most remaining states have effected statutory/regulatory changes and are progressing toward plan compliance. A few states, however, have yet to take any significant action.

Meanwhile, research funded through the Emergency Striped



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Bass Amendment to the Anadromous Fish Conservation Act (Public Law 89-304) is proceeding to determine status of striped bass stocks and to evaluate possible impacts of environmental degradation on reproduction and survival of early life stages.

#### North Shore Area Biologist

North Shore Area Team activities for FY 82 were primarily centered on anadromous fish restoration efforts in the Merrimack River system and providing assistance to other Division projects. No new field projects were initiated in FY 82 due to a lack of project personnel. Attrition has reduced the North Shore Area Team to a one-man operation.

A summary of project activities is as follows:

Lobster larvae received from the Division's Hatchery were stocked in waters of Gloucester, Nahant and the Salem--Beverly Harbor area.

Bimonthly sampling of the inshore commercial lobster fishery was conducted from Rockport and Beverly. Sampling consisted of onboard measuring, sexing and physical observations of all lobsters captured during a one-day trip. An average of 200 traps were hauled per day. All data were forwarded to the Coastal Lobster Investigation project.

The Resource Assessment project was assisted with sea sampling on spring and fall cruises.

Four hundred rainbow smelt were aged by scale reading techniques for the Plymouth Power Plant project. This brings the total number of smelt aged in the past three years to 1,500.

A survey of moderately contaminated shellfish flats in Newbury was conducted to provide population estimates for the Town's shellfish management plan.

Assistance was provided to the Statistics project with review and mailing of 1982 license applications. Due to the large number of errors encountered in computer-printed applications, hand editing and correcting was necessary. This task was very labor intensive and spread over a long period of time.

No major fish kills occurred in the North Shore area. Two chemical spills were investigated. An aluminum sulfate spill in Salem was investigated and the source located. The responsible party was assessed cleanup costs. A continuing problem with oil discharged into





Bull Brook in Ipswich was investigated, and in cooperation with DEQE the responsible party was notified that action would be taken unless the situation was corrected. The problem has now been corrected.

In keeping with the Division's commitment to the policy and technical committees for the restoration and management of anadromous fish in the Merrimack River basin, the following work was performed:

Monitoring of recreational catch of Atlantic salmon and American shad was conducted on a time-available basis. Documented Atlantic salmon catch was 17 fish. Shad catch was estimated in the thousands.

Attempts to capture adult salmon were unsuccessful despite the presence of many fish. The fish elevator scheduled to be operational for the spring "82" run suffered a few setbacks and will not be operational until September 1982. Until this facility is on line the likelihood of capturing adult salmon for brood stock purposes is negligible.

Turbine mortality studies were conducted with Atlantic salmon smolts to provide reasonable estimates of fish losses through the Essex Dam Powerhouse in Lawrence. Smolts equipped with radio transmitters were forced through turbines and their downstream progress monitored. Results of this study showed a 2 percent mortality for turbines operating at 85 percent capacity.

After policy and technical committee review, regulations establishing no fishing zones in the immediate vicinity of the Essex Dam and the surrounding canal system were promulgated. The no fishing zones were routinely posted as vandals tore down signs almost as fast as they were hung.

A seminar was hosted in cooperation with the U.S. Fish and Wildlife Service to familiarize Law Enforcement personnel from Massachusetts, New Hampshire and USF&WS with certain problem areas affecting the salmon program. Enforcement officers were more evident and better informed this year and hopefully much illegal fishing will be checked.

The Strategic Plan for restoration of Atlantic salmon in the Merrimack Basin was rewritten this year to reflect the results of our most recent studies and changes in the watershed.

A considerable amount of time was spent providing assistance to applicants and Federal Energy and Regulatory Commission



regarding hydroelectric proposals at Moores Falls, Livermore Falls and Pawtucket Falls. Potential impact of these projects were reviewed and comments provided to the FERC. Assistance with fish passage requirements was provided to applicants.

In addition to previously mentioned activities, all routine project administrative tasks (budget, inventory, mileage reports, etc.) were completed.

The project leader represented the Division and/or gave presentations at 26 evening or weekend functions. Exhibits were prepared and manned for the Topsfield Fair, North Shore Fishing Tackle and Techniques Show, Lowell Heritage Days and the Merrimack River Watershed Council sponsored "Riverfest 82".

### South Shore Area Biologist

Efforts continued to monitor PCB contamination trends in the Acushnet River estuary. Ninety-two lobsters were taken from 15 sites in Buzzards Bay for analysis. Results of the analysis indicated higher average levels in the spring than in the fall. This conformed to the trend of previous years with fall averages being below the Federal Action Level (FAL) and spring averages being just slightly above the FAL. Overall, average PCB concentrations in lobsters has declined since 1979 when local companies were prohibited from discharging PCB's into the Acushnet River.

Information was collected on the sea herring fishery. Fishing locations and catch/effort were obtained from boats landing in Sandwich. Length-frequency of fish was recorded during the unloading process. Over 85% of the sea herring landed were large (>11"). Catches were 44% lower than 1981 due to a scarcity of fish.

This winter fixed gear fishermen restated their concern over gear loss caused by pair trawlers. In response, charts were prepared to indicate fixed gear positions. These were distributed to all pair trawlers.

Additionally, forty-two fishermen were provided information relative to scup potting, conch fishing, inshore fishing, fish biology and fishery regulations; one hundred thirty-six days were spent assisting other projects, and 15 meetings were attended.

With the reorganization of Area Teams in March, Tom Currier was assigned to the Resource Assessment project and Ray Heintz was assigned to the Chief of Research. Drew Kolek will be the South Shore Area Biologist assigned to Assistant Director Fairbanks.





## Coho Salmon Project

The 1979 year-class made its spawning run during the fall of 1981. Out of a stocking of 11,000 parr, 11 adults were recaptured, and one sportfish catch was confirmed. Due to low stream discharge and cold temperatures during late fall, an early spring run occurred in some North River tributaries. This, in part, explained the low return to the recapture site.

A total of 200,000 eyed eggs were purchased from the state of Washington in order to fill this gap in year-class continuity. Eggs were hatched in the Sandwich hatchery with nearly 100% success, and fry were moved to the Sullivan Hatchery when they reached appropriate size.

Sportfish catches of the 1980 year-class are encouraging. As many as 50 2-4 pound cohos were taken in Scorton Creek, Sandwich, during the winter of 1981, and a small but directed fishery developed there. Catches from several other areas were reported indicating good survival for the year-class through its first summer at sea.

A total of 70,147 parr of the 1981 year-class were stocked in the Indianhead River in the spring of 1982. This is an F<sub>2</sub> generation and a good return is anticipated.

## Anadromous Fisheries Management

A Denil type fishladder on Town Brook, Plymouth was constructed at the Newfield Street Playground. The new facility is 2' wide, 300' ± long and consists of three baffled slopes, two resting pools and a level channel across the crest of the dam. All construction is of reinforced 3,000 lb. air-entrained concrete.

At Maple Park, Wareham, three more sections (100' ±) and nine collar ties were added to the fishway in a long-term effort to connect the new fishway (1978) to the old ladder at Glen Charlie Pond. Another 600' ± of construction will be required to eventually complete the facility.

Routine maintenance and adjustment of fishways were performed throughout the Commonwealth prior to the spring migration of alewives.

A total of 19,900 alewives were transplanted from Stony Brook, Brewster, to the following ponds in order to reestablish runs or enhance productivity.

### Alewife Stocking Locations

Mill Pond, Falmouth  
Johns Pond, Mashpee  
Shawme Pond, Sandwich





Tispaquin Pond, Middleboro  
Aaron Reservoir, Cohasset  
Lilly Pond, Gloucester  
Bass River Club Pond, Yarmouth  
Kelly Pond, Dennis  
Mashpee Wakeby Pond, Mashpee  
Red Brook, Pocasset  
Childs River, Falmouth

A total of 1,457 adult shad were transplanted from the Connecticut River to the Charles River (1,145) and the Taunton River (312) and in a continuing effort to reestablish American shad to these river systems.

### Northern Shrimp

The major concern of the Northern Shrimp Program has been to monitor the Gloucester commercial shrimp fishery in an attempt to characterize its biological, sociological, and economic attributes. Project personnel also represented the Commonwealth on the Northern Shrimp Scientific and Technical (S & T) Committee, which is responsible for making recommendations and providing population data, in the form of an annual stock status report, to the Northern Shrimp Management Section.

Several Technical Committee meetings and public hearings, where reports concerning stock condition were prepared, were attended during the past year. These meetings included the annual conference of the Atlantic States Marine Fisheries Commission (ASMFC); the annual S & T Committee stock assessment workshop; public hearings to determine the 1982 open season for shrimp fishing. Also, three ad hoc meetings of the S & T Committee were attended in order to evaluate current and future research strategies and to prepare budget proposals to ASMFC. As a result of these three meetings the Committee has petitioned the NMFS Engineering Branch/Narragansett, R.I., to design and construct a new and improved research shrimp trawl, to be utilized during the annual Gulf of Maine August shrimp cruise that has been conducted by the Maine Department of Marine Resources for the past several years. Trawl testing is scheduled for October 1982, aboard the R/V GLORIA MICHELLE. This gear evaluation study is expected to last 10 days and will be staffed by personnel from the three states involved in the shrimp cooperative research program. The Committee envisions all future shrimp research surveys to be conducted aboard this vessel. The Committee also envisions limited funding from ASMFC for shrimp research in coming years; hence, the following areas have been defined as mandatory in order to maintain an adequate data base and provide management recommendations: 1) sampling the commercial fishery, 2) Gulf of Maine August Shrimp survey, 3) analysis of shrimp samples taken from the NEFC spring and fall bottom trawl surveys.



Port sampling and sample analysis were conducted in Gloucester throughout the 1982 fishing season. The original season length as adopted by the Northern Shrimp section of ASMFC was from January 1 up to April 15, but was extended to May 1 in Massachusetts in response to petition from the industry.

The following is a brief description of 1982 Gloucester Shrimp landings:

1982 Landing Data - Gloucester, MA

| <u>Month</u> | <u>Pounds Landed</u> | <u>Number of Trips</u> | <u>Number of Boats</u>         | <u>Number of Days Fished</u> |
|--------------|----------------------|------------------------|--------------------------------|------------------------------|
| January      | 253,100              | 110                    | 23                             | 18                           |
| February     | 351,900              | 181                    | 23                             | 15                           |
| March        | 299,700              | 163                    | 22                             | 20                           |
| April        | <u>479,700</u>       | <u>191</u>             | 21                             | --                           |
| Totals:      | 1,384,400            | 645                    | (Approximately 71 Days Fished) |                              |

Unpublished Reports:

"Monitoring the 1981 Massachusetts Commercial Fishery for Northern Shrimp, *Pandalus borealis*"

"Gulf of Maine Northern Shrimp Stock Status - 1981" (co-authored)

"A Preliminary Report to the Northern Shrimp Fisheries Management Board on the Condition of the Stock of Northern Shrimp in the Western Gulf of Maine" (co-authored).

Striped Bass

April 26, 1982, marked the establishment of the Division of Marine Fisheries Striped Bass Monitoring Program.

The project's function will be to maintain a weekly sampling regime of commercial catch throughout the State as well as to continue a monthly dealer telephone survey (established in April, 1981, by the Commercial Fisheries Statistics Project) that will collect total landing statistics by county. The sampling program will provide age-sex specific data at capture and will be congruent with on-going research in neighboring states in agreement with the Atlantic States Marine Fisheries Commission Striped Bass Management Plan. All sampling will be conducted at dealer locations and coordinated by the Project's principal investigator. This sampling effort will be assisted by additional DMF personnel.





As the project is in its beginning stages, a detailed report, defining the commercial catch at this time is impossible; however, a description of some preliminary data is presented below:

#### Striped Bass/Bluefish Landings - 1982

| Month   | Striped Bass |        |         | Bluefish |
|---------|--------------|--------|---------|----------|
|         | Small        | Medium | Large   |          |
| May     |              | 584    | 51,153  | 21,257   |
| June    | 198          | 1,528  | 130,770 | 80,872   |
| Totals: | 198          | 2,112  | 181,923 | 102,129  |

Over 500 striped bass have been sampled to date. Preliminary analysis indicates nine year-classes present with the 1970 year-class dominating. The fish aged so far range from 6 to 14 years old and from 62 cm to 121 cm in length. Individual weight has ranged from 6 to 51 pounds, averaging 27 pounds. The sex ratio of fish sampled has averaged 95% females.

#### BUREAU OF COMMERCIAL FISHERIES

##### Coastal Lobster Investigations

During the statewide commercial lobster pot sampling program, 12,397 lobsters were sampled from 5,736 traps for carapace length, sex, presence of eggs, condition, culls, molt stage, pathology and mortality. Catch/effort/trap, and bait type data were also collected. Eight analysis programs were constructed and debugged, and data were subsequently computer coded, keypunched, edited, and analyzed. Data from an additional 545 lobsters collected during 1980 were similarly processed.

Efforts to develop a quantitative sampling methodology for juvenile lobster were hindered due to unforeseen delays in acquisition of experimental collector construction materials. Testing during the season of greatest availability of late stage larvae was therefore forestalled; however, some research gear was prepared and set in upper Buzzards Bay, Cape Cod Bay and western Cape Cod Canal in order to test vertical orientation and stability. Results were encouraging since numerous post-larval forms of green crabs, hermit crabs, rock crabs, bay scallops, mud snails, shrimp and both larval and post-larval cunners were found to regularly inhabit the collectors. Collector design was improved in order to diminish flushing of the apparatus when hauled.

Communication with the lobster industry continued through regular attendance at meetings of industry representatives. Discussions emphasized the delegates' desire for adoption of stiffer lobster laws. On June 3, 1982, the need was realized when legislation to increase penalties for violation of Chapter 130 was signed into law. Opposition to a proposed lobster license fee increase was pronounced; however, fees were subsequently doubled. The





membership voted to oppose the Sunday lobstering closure from 1 June to 1 September and to honor Maine's v-notch lobster program which had been suggested for inclusion in the New England Fishery Management Council American Lobster Fishery Management Plan. Although ghost pot fishing was considered to be a significant problem, only a slight majority of the membership favored adopting an escape mechanism to neutralize ghost pots. New Bedford Harbor PCB contamination continued to be a major concern. The MLA proposed that the State lighten the economic hardship created through closures by purchasing contaminated lobster from local lobstermen and "ear-marking" them for depuration. The Association has started a law enforcement fund to hire off-duty wardens to augment coastal coverage.

The release of hatchery-reared 4th stage lobster larvae was coordinated. Approximately 190,000 larvae were distributed throughout Massachusetts coastal waters. Hatchery personnel were also assisted by shipping odd-colored lobsters landed by coastal lobstermen to them.

Considerable time was spent in assisting the Coastwide Resource Assessment Project. Assistance provided was: sea duty during the autumn, 1981 and spring, 1982 otter trawl surveys; manpower for the annual 1981 YOY winter flounder seine survey; computer coding, keypunching, and analysis of 1981 seine survey data; trawl survey data auditing, analysis, and annual report editing; conversion of 101 Fortran source and data files to a character code compatible with the new WHOI Vax II computer system; reorganization of tape data and program files; and, dissolved oxygen titrations of 60 water samples taken during the summer 1981 segment of the Cape Cod Bay dump site survey.

Responses were made to requests by the general public, lobster dealers, and other State agencies and institutions for information on lobster life history; annual catch statistics; tagging results; economic impact of a gauge increase; mariculture; proper methodology for lobster storage and shipment; lethal limits in holding systems; and lobster trap escape portals and degradable panels.

Coding, keypunching, and preliminary analysis of a seven-year collection of blue crab and green crab abundance data were accomplished. Environmental data from 1974-1981 were compiled for a multivariate analysis of abundance. Programs to calculate simple and multiple regression with scatterplots were constructed for the analysis.

A presentation on the status and general biology of the American lobster was made for a Bay Cable Television Program called Bay Waters. An article describing the winter 1981 lobster molting anomaly appeared in the summer, 1981 issue of "Coastal Oceanography and Climatology News".





## Cape and Islands Area Team

Biological and chemical sampling in Herring River, Wellfleet continued at sites sustaining heavy American eel mortality during the fall of 1980. Beginning in the fall of 1981 a routine, systematic monitoring of pH, conductivity and alkalinity was undertaken. Additionally, both electrofishing and beach seining were used to survey fish (specifically American eel) populations throughout the river system. Extremely low pH levels have coincided with areas of heavy eel mortality. These low pH (high acidity) readings remained consistently low from October 1981 through June 1982 with only a slight pH increase in mid-summer at several of the sample sites. Fish and aquatic invertebrate populations were extremely low in affected river areas; at most stations there were no fish. We have tentatively concluded that low pH caused the eel mortality and lack of fish fauna. In cooperation with the Cape Cod National Seashore, monitoring of eel populations and water chemistry analyses will continue through the fall of 1982.

Due to unstable economic conditions in the U.S. and abroad, the eel market demand in Europe began to plummet in late 1981 and continued to fall through the spring 1982 season. Two separate meetings of commercial eel fishermen were organized and held on Cape Cod and Martha's Vineyard to discuss the eel market outlook and other resource/management issues. A need for fishermen to band together for strength in demanding a better price from domestic dealers and as a means to find reliable markets for their eels, was evident.

Approximately 500 new tire units were added to the artificial reef site off Bass River, Nantucket Sound, in late fall 1981. Total number of units is now 1,304 (roughly 5,316 tires). This last addition was an effort to achieve the dense, clumped profile most suitable to fish habitation, and SCUBA observations revealed such a configuration. Two presentations on the artificial reef were presented at the Cape Cod Salties Sportfishing Club and the Oceans '81 Conference poster session in Boston.

A total of 10 fishermen from Massachusetts fishing ports have now travelled to the SeaFish Industry Authority's Training Program in England under a federal grant, administered by the Division of Marine Fisheries, from the Mass. CZM-Coastal Energy Impact Program. Candidates were selected from Plymouth (2), New Bedford (3), Gloucester (2), Menemsha (1), Provincetown (1) and Boston (1). The two-week trip for each fisherman included a 5-day gear technology course - an introduction to trawl gear design - at the renowned Hull center and visits to English and/or Scottish fishing ports. A key factor in selection of qualified, interested fishermen was a willingness to communicate knowledge and experience acquired to other fishermen at Association meetings or public forums. One such presentation at a monthly Massachusetts Inshore Draggermen's Association meeting has already taken place. All





fishermen reiterated invaluable knowledge gained from flume tank observations of gear modifications. An article describing the skippers' trips was printed in a recent issue of Commercial Fisheries News.

In conjunction with the Mass. Maritime Academy, the audio-visual library loan project involving acquisition of commercial fishing gear video tapes from the Marine Laboratory in Aberdeen, Scotland, was begun. This project is funded by the New England Fisheries Development Foundation with Saltonstall-Kennedy monies and a State match. Tapes depict underwater observations of trawl nets, doors and ground cables, as well as fish reaction to each type of gear. Two video tapes are presently available to fishermen through the MMA. These tapes are the result of editing (by Daniel Arnold and Arnold Carr) hundreds of hours of video footage while in Scotland. A preliminary agreement to utilize a graduate student in Scotland to further edit tape subjects deemed most important to our fishermen is in progress. Being generally recognized that our fishermen are "still fishing in the dark ages", the loan program will be invaluable in demonstrating to domestic fishermen the latest in gear technology for more efficient use of the resource.

The first phase of a gillnet study was initiated in May with deployment of a 50 fathom gillnet just south of Manomet River, Cape Cod Bay in approximately 65' water. SCUBA diving has been used to observe and photograph the gillnet over time to note its fishing ability and condition. Dives were made immediately after the net was set and monthly thereafter.

Prior to a Cape Cod public hearing on controversial gill-netting of bluefish, considerable time was devoted to examining the 1981 (net) fishery and reported conflicts. A working paper was prepared for the Marine Fisheries Advisory Commission. Interviews with fishermen and a review of the biological literature on bluefish were undertaken. After the hearing, assistance was provided to a working group assigned to draft bluefish gillnetting regulations for the MFAC. With the advent of interim regulations in early summer, 1982, work continued by monitoring permit holders by direct observations of their fishing activity or phone calls and interviews.

Cape and Islands personnel assisted the Cape and Island Extention Agent's annual update of fishing port information - principally number, type, and description of fishing vessels and support industries.

Commencing in June (1982) weekly striped bass sampling at key lower Cape fish dealers was performed as part of the federally funded Massachusetts bass sampling program. Length, weight, sex, and scales for ageing were taken for each striped bass sampled.





At the request of the editor of the Cape Cod Business Journal, an article describing the economic impact of commercial fishing on Cape Cod was prepared and subsequently published.

Assistance was provided to the Resource Assessment spring and fall cruises and diving program of the Pilgrim Power Plant Project.

Spring monitoring of squid (*Loligo pealei*) dragger activity in Nantucket Sound continued. Dragger and fish weir squid landings throughout the Sound were totalled.

#### Shellfish Technical Assistance

Technical assistance on matters relating to shellfish culture, management and harvest as well as information on the value, location, extent and type of shellfish resources in specific areas was provided on 268 occasions by the project leader and one project assistant biologist. Distribution of this assistance was as follows: 100 to 34 cities and towns; 118 to 42 public and private agencies; and 50 to individuals interested in shellfisheries or shellfish aquaculture. The project engaged in the same total number of assistance occasions (268) as in FY 81 even though it was short one assistant the entire year.

Local shellfish budgets for FY 81 were evaluated and \$300,000 was disbursed to 51 coastal communities during FY 82 representing a 27.6% reimbursement of their FY 81 shellfish expenditures. The project leader executed and took appropriate action on 39 applications for special shellfish permits to transplant seed and/or contaminated shellfish for propagation and natural depuration. As a result, approximately 4,000 bushels of contaminated quahogs and 3,000 bushels of contaminated oysters were transplanted. An additional 3,000 bushels of seed and adult oysters and about 1 million hatchery reared quahogs were also relayed.

Two major field activities were completion of a survey of the contaminated quahog resource of the Taunton River-Mount Hope Bay area and field trials with a hydraulic skiff dredge.

Nine days were spent conducting various aspects of the quahog survey onboard the F. C. WILBOUR at Fall River. Two days were needed to obtain quahog samples for DEQE and one day was spent on vessel and gear repairs. The actual completion of the stock assessment took five days. During the July 1981 survey, 63 stations (two 100 yd. tows/station) were sampled in the Taunton, Lee and Cole's Rivers as well as Mount Hope Bay. This constituted a total of 126 dredge tows. In addition, 14 stations were sampled to provide quahogs to DEQE for heavy metal, PCB and bacterial analyses. Completion of the survey brought the total number of stations sampled in the area to 126 or 252 tows since October 1980.





As was expected, data indicate a significant decline in the quahog population in the deep water portions of the Taunton River and in Mount Hope Bay. This is consistent with information obtained in previous spot surveys and quahog surveys. The major problem appears to be a significant illegal fishery being conducted by both hand tongs and small draggers. Highest densities were found to occur along the shallow banks and flats in the Taunton River primarily accessible by hand gear and in the area between the old and new shipping channels (1 bushel/tow) off the Fall River sewerage treatment and gas plants. About 75% of these quahogs at this latter site were large blunts between 3 1/2 and 4 inches longest diameter. Of note, is the occurrence of quahogs further up the Taunton River than previously recorded. Prior to the survey, no significant amount of quahogs were thought to exist above the abandoned railroad line in Somerset. During the survey it was found that commercial quantities extended beyond this point for another 1.25 miles to the Somerset-Dighton town line.

Eight days were spent working with the Division's experimental hydraulic skiff dredge and a hydraulic clam rake. Tows were made on hard bottom using the skiff dredge with Sherrill Smith of the Extension Project in Orleans. The dredge was also tried in Bourne on a variety of bottom types to determine performance in different substrate situations and to demonstrate its use to Bourne and Falmouth personnel. It was found that the dredge worked well on hard bottom, but needed modifications in order to function properly in soft or mud bottoms. As was anticipated, it did not function at all in heavy eelgrass. Diver observations indicated an average fishing efficiency of about 40% with no apparent damage to the bottom or to uncaught quahogs. A modified dredge similar to a surf clam dredge was built for future testing. The hydraulic clam rake was found to work satisfactorily and with no apparent ill-effects on the environment.

The project also conducted 14 other resource surveys. Four of these involved assessment of proposed shellfish grants in Wellfleet (2), Fairhaven and Plymouth. The two Wellfleet grants were approved. Surveys of the soft-shell clam resources of Jones River, Kingston and Carson Beach, Boston were conducted. Quahog surveys in raft culture grow-out areas were conducted in Eel Pond, Bourne and in Great Pond and Wild Harbor River, Falmouth. The surf clam resources of Nantasket Beach, Hull were surveyed aboard the F.V. PAT and a management plan was presented to the town. Oyster areas in Falmouth were checked for the presence of Pacific oysters, *Crassostrea gigas*; none were found. Bay scallop mortalities were investigated in Wareham and Falmouth. It was estimated that during the month of September 1981, over 100,000 seed scallops or 10% of the existing population died in West Falmouth Harbor. Numerous tests and analysis could not determine the cause. A mid-winter and spring survey were conducted to determine survival which was found to be normal.





Other activities included updating and reorganizing town shellfish files, scientific reprint files and bibliographic index files; and continued work up of quahog survey data. Project personnel attended and participated in 51 meetings and workshops of groups and organizations in Massachusetts and other states. Four formal presentations were made and the project co-hosted two workshops on shellfish transports with the State of Maine.

### Commercial Fisheries Statistics

The Statistics Project continued to collect and compile statistical information on territorial water fisheries under new guidelines established by the 1981 project review committee. Progress toward computerization of data processing continued at a slow but steady pace with completion of the detailed systems design prepared by the management consultant firm, Touche Ross & Co.

Due to a delay in issuance of all Division license renewals, project personnel became very involved in editing and processing of renewal applications. Unfortunately, since catch reports from commercial lobstermen and shellfishermen are sent out with license renewals, processing of 1981 lobster and shellfish statistics was delayed by approximately three months. Fishermen reported data from the 1981 shellfisheries and recreational lobster fishery is not yet available. Summarized data from the 1981 commercial lobster fishery is presented in Table 1. A total of 10,893,769 pounds of lobster, with a wholesale value of \$22,767,977 were landed by Massachusetts commercial fishermen in 1981. Of these, 9,408,261 pounds were taken inside of 69°W 41°N (considered inshore), while 1,485,508 pounds were taken outside of these boundaries (offshore). Detailed statistics on the 1981 lobster fishery will be published later in FY 1983.

As a check on accuracy of the lobster catch reporting system, 129 catch reports, submitted for the 1980 fishing year were selected for audit. Seventy-eight audits were chosen at random, while the remaining 51 were selected from that group of fishermen who had obtained "hardship" licenses over the past several years. Five auditees failed to respond to the audit and appropriate action (non-renewal of license) was taken. Sixteen auditees were unable to provide any documentation of their catch. One of these was excused for medical reasons, while the others were warned and, depending on the size of their reported catch, will be reaudited. Fishermen in this group reported harvesting 23,296 pounds of lobster.

Sixteen licensees relied on unofficial documentation such as personal logs and ledgers to substantiate their reported catch. These fishermen reported landing 94,001 pounds, while audits of their records revealed a harvest of 92,785 pounds, a difference of 1.3 percent.





Ninety-two auditees were able to provide official documentation (dealer transaction slips, tax records, etc.) to back up their catch reports. Fishermen in this group reported landing 699,386 pounds on their catch reports, while audits showed that they actually landed 673,606, a difference of 3.76 percent. Sixteen fishermen had errors exceeding 10 percent of their reported catch. Because of the relatively large size of their landings, eleven of these will be reaudited.

At the Director's request a substantial number of fishermen who had received hardship licenses over the past few years were included in the audit, and their performance was compared to that of "regular" fishermen. This was done because, in order to obtain a hardship license, the applicant must make a commitment to actively participate in the fishery and expend considerable effort on this participation. As can be seen in Table 2, a comparison of the audits of "regular" fishermen versus "hardship" fishermen, shows that not only are responses to the audit by the hardship licensees much poorer than that of regular fishermen, but also the average catch of the hardship licensee is substantially lower than that of the regular fisherman. While we have not drawn any final conclusions as to reasons for these discrepancies, the following speculations may be made: 1) some hardship licensees are not following through on their pledge to actively engage in the fishery. 2) hardship licensees, being unfamiliar with the book-keeping and audit requirements may not have paid necessary attention to detailed record keeping. 3) relative unfamiliarity with the fishery probably limits their fishing efficiency, which may take years of trial and error to maximize.

As stated earlier, 1981 catch reports from commercial shellfishermen have not yet been tabulated because license renewal applications and report forms were mailed late. However, 1980 summary data from individual shellfishermen are available and are presented in Table 3. Breakdown of 1980 fishermen-reported statistics by county is available, by request, from the Statistics Project.

A second source of shellfish harvest data, the annual report submitted by local shellfish officers, has been tabulated for 1981 and is presented in Table 4. A concerted effort both by mail and telephone again resulted in excellent reporting compliance, with all but one shellfish officer reporting.

The 1981 Massachusetts sand eel fishery reported landing 621 bushels of sand eels. This is lower than 1980 reported harvest of 755 bushels.

Monthly catch reports were collected from fish trap operators licensed to fish in Massachusetts coastal waters. Data on this fishery for calendar year 1981 are presented in Table 5.





A monthly telephone survey of wholesale fish dealers was instituted to obtain landing data on striped bass, bluefish and eels. The program has met with great success and data on 1981 Massachusetts landings of striped bass and bluefish are presented in Tables 6 through 9. With establishment of a federally-funded striped bass program, responsibility for collecting these data has been transferred to the Striped Bass Project leader.

Annual 1981 American eel harvest was reported to be less than 50,000 pounds. This is a substantial decrease from 1980 reported harvest of 204,000 pounds.

Monthly reports were submitted by 42 of 43 licensed to fish in the regulated otter trawl fishery in territorial waters from the Gloucester--Rockport line to the New Hampshire boundary. In the past, not much data were available from this fishery even though monthly reporting was required. However, an intensive effort by project personnel including written correspondence, telephone calls, personal contact and meetings with fisheries organizations, enabled us to increase reporting compliance greatly. Data from this fishery for 1981 are presented in Table 10.

The management consultant firm of Touche Ross & Co. completed their three-phase computer system design for the Statistics Project. The first phase identified needs and pointed out problem management areas with the present licensing system (which must interface with the Statistics Project for reporting compliance procedures). Because of this, the licensing system and Statistics Project have become more interactive, with Statistics Project personnel assisting in the coordination of editing and mailing out of 1982 license renewal applications. It is planned, at some future date, that the Statistics Project will evolve into a central data entry facility for both licensing and statistics. The second phase of the consultant study was a conceptual design of how the theoretical computerized statistics project would function. The third phase was the detailed design which not only identified computer hardware needs and management of the program, but also set out detailed specifications for all software development needed to implement the program. Movement toward implementation of the proposed system continued with the addition to the project, late in FY 1982, of an additional Senior Marine Fisheries Biologist whose primary duties will be actual programming of the system and advising other Division projects in statistical data evaluation.

A report entitled 1980 Massachusetts Lobster Fisheries was printed and is available from the Statistics Project. All data gathered on Massachusetts fisheries were forwarded to the National Marine Fisheries Service for inclusion in their various statistical bulletins.

For the second year in a row, we noticed an increase in requests for data and information on Massachusetts commercial





fisheries. Not only did the number of requests increase, but the complexity of requests increased, as did requests for more analysis and interpretation. It is hoped that, with eventual computerization of data tabulations, additional analysis and interpretation can be performed. As in the past, most data requests came from other governmental agencies, followed by private consultants, the media and the general public.





Table 1.

1981 MASSACHUSETTS LOBSTER FISHERY  
SUMMARY STATISTICS--COMMERCIAL

## STATE WIDE TOTALS

| LICENSE TYPE           | GEAR TYPE<br>AND NUMBER | DIVING        |        |         | POTS<br>FISHED | POWER<br>BOAT | BOAT VALUE | NON-<br>POWER<br>BOAT | BOAT<br>VALUE | POUNDS OF<br>LOBSTER |
|------------------------|-------------------------|---------------|--------|---------|----------------|---------------|------------|-----------------------|---------------|----------------------|
|                        |                         | GEAR<br>VALUE |        |         |                |               |            |                       |               |                      |
| Taken Inside 69°W 41°N |                         |               |        |         |                |               |            |                       |               |                      |
| COASTAL                | Diver                   | 5             | 7,504  |         |                | 4             | 18,060     | 1                     | 50            | 9,665                |
|                        | Potman                  | 1,223         |        | 285,186 |                | 1,222         | 19,109,669 | 85                    | 26,559        | 8,951,204            |
|                        | Both                    | 25            | 25,477 | 5,074   |                | 26            | 311,190    | 6                     | 1,270         | 177,001              |
| SEASONAL               | Potman                  | 168           |        | 3,210   |                | 157           | 317,872    | 7                     | 1,910         | 48,349               |
| OFFSHORE               | Trawl                   | 68            |        |         |                | 68            | 818,858    |                       |               | 116,321              |
|                        | Potman                  | 24            |        | 5,898   |                | 24            | 393,731    |                       |               | 105,141              |
| TOTAL                  |                         | 1,515         | 32,981 | 299,368 |                | 1,503         | 21,054,380 | 99                    | 29,789        | 9,408,261            |

## Taken Outside 69°W 41°N

|             |        |       |        |         |       |  |            |    |        |            |
|-------------|--------|-------|--------|---------|-------|--|------------|----|--------|------------|
| OFFSHORE    | Trawl  | 20    |        |         | 20    |  | 822,150    |    |        | 134,716    |
|             | Potman | 10    |        |         | 10    |  | 1,801,875  |    |        | 995,815    |
| COASTAL     | Potman |       |        |         |       |  |            |    |        | 354,977    |
| TOTAL       |        | 30    |        |         | 30    |  | 2,624,024  |    |        | 1,485,508  |
| GRAND TOTAL |        | 1,545 | 32,981 | 310,918 | 1,533 |  | 23,678,405 | 99 | 29,789 | 10,893,769 |

<sup>1</sup> includes some masked data to protect confidentiality



Table 2. Comparison of 1980 audit results of regular licensees and "hardship" licensees.

|          | Audits (%)     | No records (%) | No response (%) | Reported Catch<br>(Excluding non-respondents<br>and those with no records) |
|----------|----------------|----------------|-----------------|--|
| Hardship | 51 (40)        | 9* (18)        | 3 (6)           | 224,480 (pounds)   |
| Regular  | <u>78</u> (60) | <u>7</u> (9)   | <u>2</u> (3)    | <u>568,907</u>   |
| Total    | 129            | 16             | 5               | 793,387  |

|          | Catch substantiated<br>by audit | Percent discrepancy | Average substantiated catch |
|----------|---------------------------------|---------------------|-----------------------------|
| Hardship | 201,044 (pounds)                | 10.44%              | 5,155 (pounds)              |
| Regular  | <u>564,801</u>                  | 0.72                | 8,185                       |
| Total    | 765,845                         | 3.47                | 7,091                       |

\* 1 excused for medical reasons





Table 3.

Selected Statistics--1980 Massachusetts  
Commercial Shellfish Fishery\*

|                                  |       |
|----------------------------------|-------|
| Number of Licensees Reporting    | 2,164 |
| Licensees Reported "Not Fishing" | 756   |

Harvest

| <u>Species</u> | <u>Bushels</u>       |
|----------------|----------------------|
| Quahog         |                      |
| Chowders       | 9,916                |
| Cherrystones   | 6,882                |
| Littlenecks    | 10,853               |
| Soft Clam      | 30,359               |
| Oysters        | 7,323                |
| Bay Scallops   | 77,281               |
| Sea Scallops   | 14,323               |
| Razor Clam     | 86                   |
| Sea Clam       | 22,055               |
| Mussel         | 49,279               |
| Conch          | 10,511               |
| Sea Urchin     | 5,000 <u>pounds</u>  |
| Eels           | 61,663 <u>pounds</u> |

|  |             |
|--|-------------|
| Number of Boats Engaged in the Fishery | 1,065       |
| Value of Boats in the Fishery          | \$4,871,911 |

Gear Types Used

| <u>Type</u>                       | <u>Number</u> |
|-----------------------------------|---------------|
| Hand Devices (rakes, tongs, etc.) | 5,653         |
| Mechanical (dredges)              | 1,994         |
| Hand (SCUBA diving)               | 22            |

\*Based on annual reports from licensed fishermen





Table 4.

1981 Massachusetts Shellfish Statistics  
Based on Reports from local Shellfish Officers,\*

## Permits Issued by Cities and Towns

|                                    |        |
|------------------------------------|--------|
| Resident Family (Recreational)     | 36,835 |
| Non-resident Family (Recreational) | 6,103  |
| Commercial                         | 3,880  |
| Senior Citizen                     | 6,038  |

## Shellfish Harvest (in bushels unless otherwise indicated)

| Species          | Recreational | Commercial | Private (Grants) |
|------------------|--------------|------------|------------------|
| Quahogs (mixed)  | 17,897       | 14,687     | 2,069            |
| Littlenecks      | 5,589        | 29,219     |                  |
| Cherrystones     | 4,254        | 11,760     |                  |
| Chowders (large) | 8,944        | 20,324     |                  |
| Soft shell clams | 24,036       | 122,611**  | 61               |
| Oyster           | 3,113        | 18,828     | 7,127            |
| Bay scallop      | 8,491        | 158,520    |                  |
| Ocean quahog     | 1,000        | 3,221      |                  |
| Surf clam        | 6,493        | 27,447     |                  |
| Mussel           | 2,249        | 73,811     | 72               |
| Conch            | 120          | 71,135     |                  |
| Razor clam       | 545          | 253        |                  |
| Eels (pounds)    | 9,470        | 121,500    |                  |

\*All towns reporting except West Tisbury

\*\*includes moderately contaminated clams processed at the Division's  
Depuration Plant



Table 5.

## 1981 Massachusetts Trap Harvest as Reported by Fishermen (Pounds)

| Species          | April  | May     | June    | July   | August | Sept   | Oct | Total     |
|------------------|--------|---------|---------|--------|--------|--------|-----|-----------|
| Bluefin Tuna     | 600    |         |         |        |        |        |     | 600       |
| Bluefish         |        | 13,390  | 30,400  | 23,098 | 5,641  | 5,272  | 145 | 77,946    |
| Bonito           |        |         | 10      | 3,235  | 40,123 | 16,037 |     | 59,405    |
| Butterfish       | 14     | 6,714   | 215     | 2,105  | 492    | 3      | 17  | 9,560     |
| Cod              |        | 1,056   | 19      |        |        |        |     | 1,075     |
| Fluke            | 188    | 577     | 3,175   | 4,561  | 3,225  | 2,054  | 30  | 13,810    |
| Herring          | 100    | 897     |         | 22,125 | 18,200 |        |     | 21,322    |
| Mackerel         | 4,575  | 420,841 | 113,560 | 20,770 | 1,340  | 280    | 65  | 561,431   |
| Menhaden         |        | 1,600   |         | 377    |        |        |     | 1,977     |
| Scup             | 2,869  | 243,555 | 12,321  | 78,703 | 66,602 | 20,463 | 280 | 424,793   |
| Red hake         |        | 20      |         |        |        |        |     | 20        |
| Sea bass         |        | 4,084   | 1,050   | 238    | 774    | 558    |     | 6,704     |
| Shad             | 1,460  | 60      |         |        |        |        |     | 1,520     |
| Squid            | 22,235 | 215,921 | 4,363   | 1,890  | 812    |        |     | 245,221   |
| Squeteague       |        | 162     | 183     | 2,853  | 2,984  | 3,460  | 90  | 9,732     |
| Sea robbin       |        | 137     |         | 87     | 98     | 7      |     | 329       |
| Shad roe         | 480    |         |         |        |        |        |     | 480       |
| Tautog           | 11,140 | 14,585  | 1,835   | 304    | 121    | 12     | 5   | 2,825     |
| Pollock          |        | 5,100   | 4,000   |        |        |        |     | 9,100     |
| Spanish mackerel |        |         |         |        | 181    | 18     |     | 199       |
| Grayfish         | 70     |         |         |        |        |        |     | 70        |
| Monkfish         |        | 7       |         |        |        |        |     | 7         |
| King mackerel    |        |         |         | 14     | 6,122  | 7,951  |     | 14,087    |
| Albacore         |        |         |         |        | 13     | 3,608  |     | 3,621     |
|                  |        |         |         |        |        |        |     | 1,466,834 |





Table 6.

Massachusetts Striped Bass Landings (lbs.)  
By County and Month, 1981

|           | (Essex-<br>Plymouth) | (Barnstable-<br>Bristol) | (Dukes-<br>Nantucket) | Total   |
|-----------|----------------------|--------------------------|-----------------------|---------|
| May       | 9,657                | 35,301                   | 16,237                | 61,195  |
| June      | 25,190               | 100,041                  | 25,126                | 150,357 |
| July      | 23,467               | 59,409                   | 6,092                 | 88,968  |
| August    | 21,726               | 30,581                   | 640                   | 52,947  |
| September | 14,732               | 86,345                   | 4,423                 | 105,500 |
| October   | 15,332               | 83,476                   | 20,480                | 119,288 |
| November  | 20                   | 2,911                    | 1,302                 | 4,233   |
| Total:    | 110,124              | 398,064                  | 74,298                | 582,488 |

\*Counties combined to protect confidentiality of individual dealers

Table 7.

Massachusetts Striped Bass Landings (lbs.)  
By Month and Size Category, 1981

|           | Small   | Medium | Large   | Total   |
|-----------|---------|--------|---------|---------|
| May       | 5,385   | 999    | 54,811  | 61,195  |
| June      | 17,032  | 7,188  | 126,137 | 150,357 |
| July      | 20,830  | 5,183  | 62,955  | 88,968  |
| August    | 22,887  | 4,150  | 25,910  | 52,947  |
| September | 20,739  | 5,774  | 78,987  | 105,500 |
| October   | 19,763  | 5,328  | 94,197  | 119,288 |
| November  | --      | --     | 4,233   | 4,233   |
| Total:    | 106,636 | 28,622 | 447,230 | 582,488 |





Table 8.

Massachusetts Striped Bass Landings (lbs.)  
By County\* and Size Category, 1981

|             | Small   | Medium | Large   | Total   |
|-------------|---------|--------|---------|---------|
| Essex-      |         |        |         |         |
| Plymouth    | 58,303  | 9,677  | 42,144  | 110,124 |
| Barnstable- |         |        |         |         |
| Bristol     | 48,011  | 15,928 | 334,125 | 398,064 |
| Dukes-      |         |        |         |         |
| Nantucket   | 322     | 3,017  | 70,961  | 74,300  |
| Total:      | 106,636 | 28,622 | 447,230 | 582,488 |

\*Counties combined to protect confidentiality of individual dealers

Table 9.

Massachusetts Bluefish Landings (lbs.)  
By County\*, 1981

|           | Essex-<br>Plymouth | Barnstable-<br>Bristol | Dukes<br>Nantucket | Total   |
|-----------|--------------------|------------------------|--------------------|---------|
| May       | 4,413              | 5,730                  | 10,685             | 20,828  |
| June      | 12,690             | 35,472                 | 47,500             | 95,662  |
| July      | 28,988             | 64,407                 | 54,572             | 147,967 |
| August    | 11,006             | 48,355                 | 30,234             | 89,595  |
| September | 13,415             | 56,489                 | 8,385              | 78,289  |
| October   | 3,237              | 13,654                 | 16,973             | 33,864  |
| November  | --                 | 30                     | --                 | 30      |
| Total:    | 73,749             | 224,137                | 168,349            | 466,235 |

\*Counties combined to protect confidentiality of individual dealers



Table 10.

Summary Statistics for the Regulated Otter Trawl Fishery  
of Massachusetts, Nov. 15, 1980 through September 30, 1981

|                          | <u>Time Period</u>      |                        |
|--------------------------|-------------------------|------------------------|
|                          | <u>11/15/80-3/31/81</u> | <u>6/15/81-9/30/81</u> |
| Number of Fishermen      | 11                      | 10                     |
| Total Days Fished        | 179                     | 149                    |
| Total Tows               | 495                     | 294                    |
| Average Tow Time (hours) | 2.5                     | 2.7                    |

| Catch by Species (pounds) |         |        | <u>Total</u> |
|---------------------------|---------|--------|--------------|
| Haddock                   |         |        |              |
| Large                     |         | 350    | 350          |
| Scrod                     | 1,435   | 6,510  | 7,945        |
| Cod                       |         |        |              |
| Large                     | 4,015   | 5,736  | 9,751        |
| Market                    | 11,213  | 15,900 | 27,113       |
| Scrod                     | 9,069   | 17,470 | 26,539       |
| Yellowtail                | 22,380  | 46,227 | 68,607       |
| Winter flounder           | 8,335   | 17,935 | 26,270       |
| Grey sole                 | 1,885   | 315    | 2,200        |
| Dabs                      |         |        |              |
| Small                     | 10,335  | 9,830  | 20,165       |
| Large                     | 23,210  | 33,263 | 56,473       |
| Whiting                   | 347,665 | 2,660  | 350,325      |
| Pollock                   | 5       | 4,255  | 4,260        |
| Red hake                  | 51,960  | 2,335  | 54,295       |
| White hake                | --      | 10     | 10           |
| Monkfish                  | 3,155   | 104    | 3,229        |
| Squid                     | 5,735   | --     | 5,735        |
| Mackerel                  | 500     | --     | 500          |





## Marketing

During this fiscal year, promotional exhibits were conducted at the Barnstable County Fair, Plymouth Fishermen's Festival, Scituate Harvest Festival, Norfolk County Fair, Cape Cod October Seafest, Northeast Food Service Show, and Faneuil Hall Nutrition Day. Each promotion included the following: cooking demonstrations of both traditional and non-traditional species; filleting, shucking, and handling demonstrations; an attractive display of whole fish on ice; and slide shows.

Lectures were given to several groups involved in food service or education. This included the sales force of Dole and Bailey, Inc., UMASS hotel and restaurant management students, vocational school culinary arts teachers, and attendees of a UMASS food conference, and a National Restaurant Association seafood seminar. On a more elementary scale, a 'show and tell' session was given to a second grade at Arlington School. Lectures were typically accompanied with a slide show, and some included demonstrations as well.

On occasion, assistance was given to the New England Fisheries Development Foundation. A fish display was set up for their Seafood Expo '82. A seminar for the Chefs De Cuisine in St. Louis and a survey of seafood departments of major chain stores in the area were conducted. Also, a lecture was given to the sales team of Leiber Foods in Georgia.

NMFS was aided by distributing a batch of experimental small cultured surf clams to area restaurants and seafood markets. Later a survey of dealers' responses was conducted and reported to NMFS.

A large portion of this year's effort was dedicated to the completion of a federally-funded project--the development and test marketing of a processed squid ring product. Last fiscal year, the necessary processing was developed by NMFS and the first lot of squid processed by Oceanside Fisheries. Continuing this year, additional squid was processed and brought to the Eastern States Exposition for test marketing. Taste-tests of squid rings and strips, and a blind comparison of squid rings and clam strips was conducted. Demonstrations of squid cleaning and cooking, a slide show of harvesting and processing, and informational literature was available to all who stopped at the booth. It is estimated that approximately 10,000 visitors tried the squid products; completed questionnaires were obtained from over 3,000 tasters.

The test marketing results were processed, and a formal report written and distributed. A proposal was prepared and submitted to the New England Fisheries Steering Committee to obtain funds for a follow-up project. Project results were positive, and industry response was reaffirming. Hopefully, it won't be too long before consumers can obtain ready-to-use breaded, frozen squid products.





Excellent media coverage was obtained during the squid promotion. Throughout the year print coverage was received for many of our events. Articles written by project personnel appeared in "Commercial Fisheries News", "Seafood America", and the Brockton Enterprise. An article on care of a sportsman's catch was accepted by "Outdoor Life". In addition, evidence of our efforts are appearing in publications such as "National Fishermen", "The Fish Boat", and "Seafood Leader".

Television appearances were made on three episodes of "Jack Woolner's Outdoors". Topics discussed were the squid project, bay scallops, and cod. The Eastern States squid promotion attained good coverage from three area stations.

In October, our own weekly radio program began. "Fish 'n Tips" is a fifteen minute seafood education program airing on WRKO, 68 AM. Guests from the industry are invited, or topics are covered by project personnel. The program initially aired at 4:15 Sunday mornings; in May it moved to 4:45.

This year was marked by personnel changes. In January, Neil Murphy resigned as project leader to take a job with the Kroger Company. Susan Faria was promoted to project leader in March, and in June, the assistant's position was filled by Kathy McGee.



## Licensing

During 1981, the Division's licensing staff issued a total of 23,717 permits resulting in a collected revenue of \$603,157. This represents a 4% increase in license issuance over 1980. The following types of permits were issued in 1981:

| <u>Commercial Permits</u>                     | <u>No. Issued</u>     |
|---|-----------------------|
| Coastal Lobster                               | 1515                  |
| Offshore Lobster                              | 603                   |
| 60-99' Boat                                   | 126                   |
| Under 60' Boat                                | 900                   |
| Seasonal Lobster                              | 387                   |
| Individual                                    | 605                   |
| Shellfish                                     | 1988                  |
| Rod and Reel                                  | 613                   |
| Shellfish and Rod and Reel                    | 286                   |
| <u>Duplicate</u>                              | <u>37</u>             |
| Total Commercial Permits                      | 7,060                 |
| <br><u>Dealer Permits</u>                     | <br><u>No. Issued</u> |
| Wholesale                                     | 492                   |
| Retail  | 832                   |
| Retail Truck                                  | 68                    |
| Bait  | 64                    |
| <u>Duplicate</u>                              | <u>1</u>              |
| Total Dealer Permits                          | 1,457                 |
| <br><u>Special Permits</u>                    | <br><u>No. Issued</u> |
| Non-Commercial Lobster                        | 13,515                |
| Regulated Fishery                             | 204                   |
| Master Digger                                 | 102                   |
| Subordinate Digger                            | 393                   |
| Bait (Contaminated Softshell Clams)           | 832                   |
| Other (Scientific, Aquaculture, Shell, Relay) | 73                    |
| <u>Duplicate</u>                              | <u>81</u>             |
| Total Special Permits                         | 15,200                |

A record of each permit is entered on the M.D.C. data processing system and provides a cumulative, up-to-date listing of all permit holders throughout the year. The printout records are provided, at cost, to individuals in the private sector, law enforcement agencies, and other environmental agencies.











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